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**THIS PATENT APPLICATION IS BEING**  
**FILED WITH SMALL ENTITY STATUS**

# **CUTTER ASSEMBLY**

## **BACKGROUND OF THE INVENTION**

### **1. Field of the Invention**

The present invention relates to a cutter assembly, and more particularly to a cutter assembly which has disposable components.

### **2. Description of Related Art**

With reference to Fig. 4, a cylindrical cutter is used to drill a through hole in a material such as a metal plate when the diameter of the hole required is too great for the available drill bits. A cylindrical cutter in accordance with the prior art comprises an adapter (50) and a central drill (52). The adapter (50) is connected to a rotating machine such as an electric drill and is actuated to rotate by the rotating machine. A cylindrical saw (51) is integrally formed on the bottom of the adapter (50) to drill a through hole in a material such as a metal plate. The central drill (52) is detachably mounted in the bottom of the adapter (50) and extends out from the saw (51). To assemble the central drill (52) to the adapter (50), a central hole (not numbered) is defined in the bottom of the adapter (50) for one end of the central drill (52) to be securely received in the central hole. A threaded hole (not numbered) is defined in the adapter (50) and communicates with the central hole. A positioning screw (53) is screwed through the threaded hole and abuts against the central drill (52) to securely position the central drill (52) relative to the adapter (50) and to make the central drill (52) rotate with the adapter (50).

In operation, the central drill (52) will drill a small hole in the metal plate firstly. Then, the saw (51) will drill a through hole with a desired diameter in the

1 metal plate and coaxial with the central drill (52). With the arrangement of the  
2 central drill (52), the through hole will be defined in the metal plate at a precisely  
3 predetermined position.

4 However, because the saw (51) is integrally formed on the adapter (50)  
5 of the conventional cutter, another cutter with a saw having a different diameter  
6 is needed when a through hole with a different diameter is to be cut which  
7 involves excessive stocks if a user is to be prepared for different work pieces. In  
8 addition, when the saw (51) is worn, the whole adapter (50) with the saw (51)  
9 must be replaced with a new one, which is wasteful in material.

10 With reference to Fig. 5, another conventional cutter in accordance with  
11 the prior art comprises an adapter (60), a cutter body (62) and a central drill (63).  
12 A threaded portion (61) is formed on the bottom end of the adapter (60), and the  
13 cutter body (62) has an inner threaded hole (not numbered) screwed with the  
14 threaded portion (61) on the adapter (60). A saw (not numbered) is formed on the  
15 cutter body (62). The central drill (63) extends through the cutter body (62) and  
16 into the adapter (60). A positioning screw (64) is screwed through a threaded  
17 hole (not numbered) defined in the adapter (60) and abuts against the central drill  
18 (63) to position the central drill (63) relative to the adapter (60). When the saw  
19 has become worn, the cutter body (62) can be detached from the adapter (60) and  
20 replaced with a new one.

21 However, the threaded portion (61) on the adapter (60) and the inner  
22 threaded hole in the cutter body (62) must bear a significant load during the  
23 operation of the cutter and are easily damaged. When the threads have become  
24 damaged, to disengage the cutter body (62) from the adapter (60) is difficult or

1 even impossible.

2 To overcome the shortcomings, the present invention tends to provide a  
3 cutter assembly to mitigate or obviate the aforementioned problems.

#### 4 SUMMARY OF THE INVENTION

5 The main objective of the invention is to provide a cutter assembly that  
6 allows easy detachment of a cutter body from an adapter when the cutter body  
7 has been damaged. The cutter assembly has an adapter, a cutter body, a central  
8 drill and two positioning screws. The adapter has a hole with a bottom defined in  
9 the bottom of the adapter and a drill hole co-axially defined in the bottom of the  
10 hole. The cutter body is detachably attached to the adapter and has a base, a post  
11 and a cylindrical saw. The post extends from the top of the base and is received in  
12 the hole in the adapter. A first facet is defined in the outer periphery of the post.  
13 The saw is formed on and extends from the bottom of the base. The central drill  
14 is detachably mounted on the adapter and extends through the cutter body. The  
15 central drill has a second facet defined in the outer periphery of the central drill.  
16 The positioning screws are screwed into the adapter and respectively abut  
17 against the facets on the cutter body and the central drill.

18 Other objects, advantages and novel features of the invention will  
19 become more apparent from the following detailed description when taken in  
20 conjunction with the accompanying drawings.

#### 21 BRIEF DESCRIPTION OF THE DRAWINGS

22 Fig. 1 is a perspective view of a cutter assembly in accordance with the  
23 present invention;

24 Fig. 2 is an exploded perspective view of the cutter assembly in Fig. 1;

1            Fig. 3 is a side plan view in partial cross section of the cutter assembly in  
2   Fig. 1;

3            Fig. 4 is a side plan view in partial cross section of a conventional cutter  
4   in accordance with the prior art; and

5            Fig. 5 is an exploded perspective view of another conventional cutter in  
6   accordance with the prior art.

### 7   DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

8            With reference to Figs. 1 to 3, a cutter assembly in accordance with the  
9   prior art comprises an adapter (10), a cutter body (20), a central drill (30) and two  
10   positioning screws (40,42). The adapter (10) is used to connect to a rotating  
11   machine (not shown) and is actuated to rotate by the rotating machine. The  
12   adapter (10) has a bottom, an outer surface, a cutter hole (11), a drill hole (12), a  
13   first threaded hole (13) and a second threaded hole (14). The cutter hole (11) is  
14   defined in the bottom of the adapter (10) and a wall defines a bottom of the  
15   cutter hole (11). The drill hole (12) is defined in the wall defining the bottom of  
16   the cutter hole (11) and is co-axial with the cutter hole (11). The threaded holes  
17   (13,14) are defined in the outer surface of the adapter (10) and respectively  
18   communicate with the cutter hole (11) and the drill hole (12).

19            The cutter body (20) is detachably attached to the adapter (10) and has a  
20   base (not numbered), a post (21), a central hole (23) and a cylindrical saw (22).  
21   The post (21) extends from the top of the base and is received in the cutter hole  
22   (11) in the adapter (10). The post (21) has a first facet (24) defined in the outer  
23   periphery of the post (21), and a first stop (25) is formed on the post (21)  
24   adjacent to the first facet (24). The central hole (23) is axially defined through

1 the post (21) and the base. The cylindrical saw (22) is formed on and extends  
2 from the bottom of the base. The central drill (30) is detachably mounted on the  
3 adapter (10) and extends through the central hole (23) in the cutter body (20).  
4 The central drill (30) has a first end extending through the central hole (23) in the  
5 cutter body (20) and received in the drill hole (12) in the adapter (10). The  
6 central drill (30) has a second facet (31) defined in the outer periphery of the  
7 central drill (30) near the first end to form a second stop (32) adjacent to the  
8 second facet (31).

9         The positioning screws (40,42) comprise a first positioning screw (40)  
10 and a second positioning screw (42). The first positioning screw (40) is screwed  
11 through the first threaded hole (13) in the adapter (10) and has a free end abutting  
12 against the first facet (24) on the cutter body (20). The second positioning screw  
13 (42) is screwed through the second threaded hole (14) in the adapter (10) and has  
14 a free end abutting against the second facet (31) on the central drill (30). The free  
15 ends of the positioning screws (40,42) respectively abut against the stops (25,32)  
16 on the cutter body (20) and the central drill (30). With the arrangement of the  
17 positioning screws (40,42), the cutter body (20) and the central drill (30) are  
18 securely attached to and rotate with the adapter (10). Additionally, with the  
19 abutments between the positioning screws (40,42) and stops (25,32), the cutter  
20 body (20) and the central drill (30) can be kept from escaping from the hole (11)  
21 and drill hole (12) in the adapter (10).

22         In such a cutter assembly, the direction of threads of the threaded holes  
23 (13,14) and the positioning screws (40,42) are perpendicular to the rotating  
24 direction of the cutter assembly. Accordingly, the threads of the positioning

1 screws (40,42) and the threaded holes (13,14) in the adapter (10) will not bear a  
2 load during the operation of the cutter. The positioning screws (40,42) are not  
3 easily damaged, and the useful life of the cutter assembly is prolonged. In  
4 addition, when the cylindrical saw (22) on the cutter body (20) becomes worn,  
5 the cutter body (20) can be easily detached from the adapter (10). Accordingly,  
6 waste in material is prevented.

7       Even though numerous characteristics and advantages of the present  
8 invention have been set forth in the foregoing description, together with details  
9 of the structure and function of the invention, the disclosure is illustrative only,  
10 and changes may be made in detail, especially in matters of shape, size, and  
11 arrangement of parts within the principles of the invention to the full extent  
12 indicated by the broad general meaning of the terms in which the appended  
13 claims are expressed.